Listing of Claims

This list of claims will replace all prior versions, and listings of claims in the application:

1. (Previously presented). A method to stabilize high aspect ratio, post-etch lithographic feature against collapse, the method comprising:

coating a substrate with a substantially organic underlayer;

coating said underlayer with a photoresist comprising materials that form a stable, etch-resistant, non-volatile oxide;

imagewise exposing said photoresist to radiation;

developing an image in said photoresist;

transferring said image through said underlayer into said substrate thus forming a high aspect ratio resist image; and

treating said high aspect ratio resist image with a chemically-reducing plasma.

2. (Currently amended). ~~A~~ The method to stabilize high aspect ratio, post-etch lithographic feature against collapse, according to claim 1, wherein said photoresist comprises an element capable of forming a stable, etch-resistant, non-volatile oxide selected from the group consisting of silicon, phosphorous, germanium, aluminum, and boron.

3. (Currently amended). ~~A~~ The method to stabilize high aspect ratio, post-etch lithographic images against collapse, according to claim 1, wherein said resist is a bilayer resist comprising:

an organic underlayer formed on said substrate; and

a photoresist comprising materials that form a stable, etch-resistant, non-volatile oxide formed on said underlayer.

4. (Currently amended). ~~A~~ The method to stabilize high aspect ratio, post-etch lithographic images against collapse, according to claim 1, wherein transferring said image comprises etching wherein said etching comprises passivating chemistry.

5. (Currently amended). ~~A~~ The method to stabilize high aspect ratio, post-etch

lithographic images against collapse, according to claim 4, wherein passivating chemistry comprises any process that generates hygroscopic moieties.

6. (Currently amended). ~~A~~ The method to stabilize high aspect ratio, post-etch lithographic images against collapse, according to claim 4, wherein passivating chemistry comprises an SO_2 and O_2 containing plasma.

7. (Currently amended). ~~A~~ The method to stabilize high aspect ratio, post-etch lithographic images against collapse, according to claim 1, wherein said chemically-reducing plasma comprises hydrogen.

8. (Currently amended). ~~A~~ The method to stabilize high aspect ratio, post-etch lithographic images against collapse, according to claim 1, wherein said chemically-reducing plasma comprises a hydrogen-generating species.

9. (Currently amended). ~~A~~ The method to stabilize high aspect ratio, post-etch lithographic images against collapse, according to claim 1, wherein said underlayer comprises an organic material selected from the group consisting of tuned polymers, novolacs, and low-k dielectrics.

10. (Currently amended). ~~A~~ The method to stabilize high aspect ratio, post-etch lithographic images against collapse, according to claim 1, wherein said underlayer comprises an organic material essentially comprising carbon, hydrogen, and oxygen.

11. (Currently amended). ~~A~~ The method to stabilize high aspect ratio, post-etch lithographic images against collapse, according to claim 1, wherein said photoresist comprises a polymer having acid-cleavable moieties bound thereto.

12. (Currently amended). ~~A~~ The method to stabilize high aspect ratio, post-etch lithographic images against collapse, according to claim 1, wherein said photoresist comprises a polymer formed by polymerizing one or more monomers selected from the group consisting of

acrylate, methacrylate, hydroxystyrene optionally substituted with ~~Cl-6-alkyl, CS-2o~~ C_{1-6}-alkyl, C_{2-20} cyclic olefin monomers, and combinations thereof, the polymer having acid-cleavable moieties bound thereto, wherein all such moieties are sily lethoxy groups optionally substituted on the ethoxy portion thereof with ~~Cl-6-alkyl~~ C_{1-6}-alkyl, phenyl, or benzyl.

13. (Currently amended). ~~A~~ The method to stabilize high aspect ratio, post-etch lithographic images against collapse, according to claim 1, wherein said photoresist comprises a radiation-sensitive acid generator.

14. (Currently amended). ~~A~~ The method to stabilize high aspect ratio, post-etch lithographic images against collapse, according to claim 1, wherein said radiation comprises electromagnetic radiation or electron beam radiation.

15. (Currently amended). ~~A~~ The method to stabilize high aspect ratio, post-etch lithographic images against collapse, according to claim 1, wherein said radiation comprises ultraviolet radiation or extreme ultraviolet radiation.

16. (Currently amended). ~~A~~ The method to stabilize high aspect ratio, post-etch lithographic images against collapse, according to claim 1, wherein said radiation comprises x-ray radiation.

17. (Currently amended). ~~A~~ The method to stabilize high aspect ratio, post-etch lithographic images against collapse, according to claim 1, wherein transferring said image further comprises forming a reduced critical dimension bilayer resist image.

18-19. (Canceled).

20. (Previously presented). A method of fabricating semiconductor devices using a stabilized, high aspect ratio bilayer resist image comprising:

coating a substrate with an organic underlayer;

coating said underlayer with a photoresist comprising a material that form a stable, etch-

resistant, non-volatile oxide;

imagewise exposing said photoresist to radiation;

developing an image in said photoresist;

transferring said image through said underlayer into said substrate thus forming a high aspect ratio resist image;

treating said high aspect ratio resist image with a chemically-reducing plasma;

transferring said image into said substrate forming a circuit image; and

forming circuit element materials in said circuit image.

21. (Currently amended). ~~A~~ The method of fabricating semiconductor devices using a stabilized, high aspect ration bilayer resist image, according to claim 20, wherein said circuit element materials comprise materials selected from the group consisting of dielectric, conductor, semiconductor, and doped semiconductor materials.

22-26. (Canceled).